REMARKS

Upon entry of this amendment, claims 1-4 and 6-11 will be pending in this application. Applicants amend claims 1 and 3 to incorporate the subject matter of claim 5. Claim 5 is cancelled. No new matter is added. Entry is respectfully requested.

Rejection under 35 U.S.C. § 103

Claims 1-11 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Yoshida (JP 51027639), in view of Brinkmann (5075176).

With respect to independent claims 1 and 3, Yoshida was cited as disclosing a spark plug comprising an electrically conductive sealing layer connecting the terminal and center electrodes, via electrically conductive glass containing a Cu-Zn (paragraphs [0002], [0006], Table 1, row 11, Table 2 and paragraph [0020]).

The Office Action concedes that Yoshida fails to disclose Cu-Zn in alloy form. Nonetheless, the Office Action cites Brinkmann for this feature, asserting that Brinkmann discloses alloy formation which provides better electric resistance and mechanical strength than pure metals (column 2, lines 26-29).

The reason for the rejection was that it would have been obvious to provide the Cu-Zn contained in the metal component of the conductive glass of Yoshida in alloy form, as taught by Brinkmann, in order to improve the mechanical strength of the conductive sealing material.

Applicants respectfully traverse the rejection, amend claims 1 and 3 to incorporate the subject matter of claim 5, and cancel claim 5.

Instant claims 1 and 3 refer to a product and method, respectively. All remaining claims depend from either of claim 1 or 3. Claims 1 and 3 each refer to a Cu-Zn alloy in an amount of larger than 10 mass% of a metal component/powder.

Yoshida discloses a conductive vitreous sealing material used to seal a center electrode in the axial hole of the insulating porcelain tube of a spark plug. Yoshida addresses the problem of a weak seal by introducing a metal or alloy powder as a "wetting improving component" into the sealing material (See, *inter alia*, English language translation of Yoshida; pages 1-3).

Brinkmann is directed toward reducing the tensile pulling force of an electrical connector pair (i.e., a "plug" and "socket"). Brinkmann describes coating the surface of a plug with a *tin* alloy in order to reduce plug-in force (See col. 1, line 45 to col. 2, line 33). Brinkmann also states that alloy formation causes a reduction in conductivity, but an increase in hardness, and that such contrary effects must be optimized through the addition of another element to the *tin* alloy. Brinkmann further discloses that its coating alloy should have the lowest possible melting point, and in no case should that melting point be above 390 °C (See generally, col. 2, lines 1-50).

It would not have been obvious to combine the cited references because Brinkmann's description of reducing tensile forces is inapposite to Yoshida's attempt to strengthen a seal. In particular, the reduction of pulling forces between two connectors has nothing to do with solving the problem of improving wettability, while maintaining the conductivity and sealing characteristics, of vitreous sealing materials in spark plugs (See Yoshida, page 3, line 1-2).

Further, Brinkmann describes a tin alloy, whereas Yoshida relates to a Cu-containing glass. Accordingly, Brinkmann's teaching of the advantage of tin (i.e., having a low melting point), teaches away from the claimed alloy comprising Cu (i.e., melting point of 1083 °C) and Zn (i.e., melting point of 419 °C). Accordingly, Brinkmann describes applying its plug coating by a molten bath method, whereas Yoshida describes welding a sealing material to the end circumference of the electrode stem and terminal stem, while each stem is being sealed at 900 °C

(See page 3, line 1-17). It would be difficult, if not impossible, to combine these references from a technical standpoint.

Likewise, Brinkmann expressly states that alloys are harder and less conductive than intermetallic phases (See col. 2, lines 20-22). In contrast, Yoshida, as described above, requires that conductivity be maintained (See page 3, line 1-2). Thus, Brinkmann teaches away from using a Cu-Zn alloy, as claimed, unless the alloy was to also include tin and another element that would aid in balancing hardness with conductivity.

In addition, Yoshida teaches away from using Cu-Zn in an alloy form. Yoshida discloses Zn *powder* used as a wettability improving component. Yoshida describes that the conductive vitreous sealing material is

> "welded to the end circumference of the electrode stem and the terminal stem of the ignition plug, while the electrode stem and the terminal stem are being sealed at the temperature of about 900°C, because the any of the aforementioned *wettability improving components has a low melting point.* As a result, the individual stems can be firmly fixed to realize the sealing, which hardly slackens while the ignition plug is being used. As a result, remarkable improvements result in the durabilities of the glass-sealed ignition plug and the glass-sealed resisting ignition plug." (See page 3, second paragraph).

In this regard, the Office Action incorrectly assumes that it would have been obvious to provide the Cu-Zn contained in the metal component in an alloy form as taught by Brinkmann, in the device of Yoshida. For example, if Zn is alloyed with Cu in advance, the Cu-Zn alloy has a higher melting point than Zn alone. Thus, the alloyed Zn would not exhibit the intended effect of improving wettability. That is, Yoshida's invention teaches that the wettability improving component is not alloyed in advance, which teaches away from the use of preliminarily alloyed Zn.

Moreover, as described above, the incorporation of claim 5 into claims 1 and 3 further distinguishes the claimed invention over the references of record. For example, Yoshida describes in Table 1, Sample 11, an Example in which 5 wt% Zn is added to 45 wt% Cu. During the glass seal process at 930°C, Cu does not melt, and only Zn melts. One part of the melted Zn is diffused into the glass component; another part of the melted Zn is diffused into and alloyed with Cu; and yet another part of melted Zn remains as it is. That is, only a fraction of the Zn component is alloyed with Cu. Hence, Yoshida fails to teach or suggest a Cu-Zn alloy powder in an amount of larger than 10 mass%, as claimed.

Claim 3 also refers to a Cu-Zn as being provided in an alloy form before the glass seal process. That is, claim 3 differs from Yoshida at least in that Cu and Zn are first alloyed after starting the glass seal process.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

Ryan C.

Ryan C. Cady
Registration No. 56,762

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860
WASHINGTON DC SUGHRUE/265550
65565
CUSTOMER NUMBER

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